Effect of Mobile Testing, Treatment and Care Management for Obstructive Sleep Apnea on Adherence and Clinical Outcomes in Professional Drivers

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INTRODUCTION

Studies suggest that OSA may affect up to one-third of professional truck drivers in the US.

Untreated OSA disqualifies a professional diver for duty unless it is adequately treated with PAP, and efficacy and adherence data are reported to a Certified Medical Examiner annually.

Due to the perceived/real ramifications of OSA in the professional driving workforce, underreporting is common and guidelines now require drivers with a BMI $\geq$ 35 to be tested.

WIth over 3 million professional truck drivers on US roads at any given time, clearly mobile sleep apnea risk assessments, testing, treatment and ongoing management is needed.

This study was designed to determine the implications of an integrated mobile OSA testing and treatment approach coupled with remote care management in a professional driver workforce using objective treatment outcomes of adherence, efficacy and well-validated assessment tools.

METHODS

Individual drivers were recruited by company safety directors using known biometric risk factors for OSA using IRB approved advertisements and education.

Inclusion criteria: volunteer professional drivers 21-80 yrs old, employed $\geq$ 1 yr with JB Hunt.

Exclusion criteria: uncontrolled HTN, CHF, sev COPD, prior hx of OSA and/or PAP use.

Procedure: At Forest Park, GA terminal, drivers completed an IRB approved informed consent, medical exam, ESS, SF-36, and Functional Outcomes of Sleep Questionnaire (FOSQ). Sleep testing was performed by RPSGTs at the terminal using an Embletta PDS type III. Data were remotely uploaded, then scored by 2 RPSGTs and interpreted by 1 board certified sleep physician in a blinded fashion using AASM scoring criteria (Iber et al., 2007). Subjects w/AHI>15 were educated and fitted with

METHODS(Cont'd)

Auto-PAP equipped w/cellular transmitter (ResTraxx, ResMed, Inc). Wireless data were remotely uploaded every day over the first 30 days, then using mailed data cards at months 2 and 3, and again at months 6, 9 and 12. Throughout the year, objective APAP data were used along with subjective driver report for management of medical, technical and behavioral issues. At entry, 3 mos and 12 mos, SF-36 and FOSQ were repeated. ESS was repeated at the end of the study. Subjects were coached to FMCSA standards PAP use (>4 hrs/use; >70% of sleeping periods). Two-tailed t-tests were performed on test-retest measures and subscales.
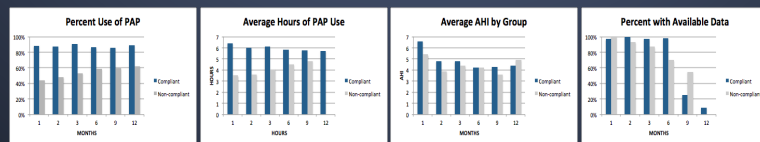
RESULTS

Ninety-one subjects were enrolled (98% male) over 2 years; 72 had an AHI>15; 55 completed the 12 month protocol (avg age = 47 yr). Co-morbid condition in the 55 subjects included: HTN (32); High Chol (17); Type II DM (11). Exam noted crossbite in 7/55; Family Hx of OSA 9/55. Additional exam and sleep testing findings are as follows:

EXAM	AVG	RANGE
BMI	41.0	26.8-63.8
NECK	18.4"	16-22"
MP score	3	1-4

| TEST	AVG	RANGE
AHI (sup)	43.7 (54)	26.8-125
O_2 Nadir	77.4%	52-89%
Hypox.Bur.	15.4%	0-68.8%

Of the 55 subjects, 3 had CSA; 1 had OHS. Of 51 with OSA, 65% sev; 31% mod; 4% mild. PAP treatment included 3 Adaptive servo-ventilators; 2 auto-titrating Bi-level; 50 Auto-PAP. Compliance to FMCSA standards: 1mo 73%; 2mo 71%; 3mo 71%; 6mo 78%; 9mo 80%; 12mo 82%. Non-compliance at 1mo predicted non-compliance at 12mos (100%, n=7). The availability of objective remote data was reduced after the first 3 months in non-Compliant patients.

RESULTS (Cont'd)
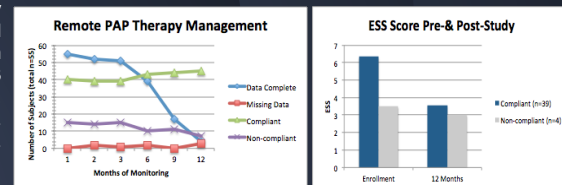
Significant 12 mo change was noted in ESS SF-36 subscales for *Vitality (p=0.001), **Social Function (p=0.03) and *Health Transition (p<0.001), and FOSQ subscales for *Gen Productivity (p=0.005), *Social Outcome (p=0.01) and *Vigilance (p=0.06). FOSQ totals were not sig. different (0 mo = 17.88; 12 mo 18.46)
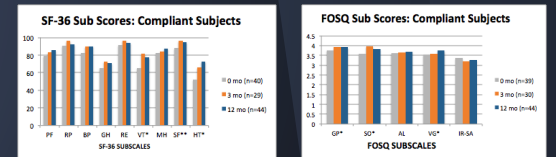
CONCLUSIONS

This study suggests that remote PAP adherence and efficacy management results in Percentage Use, Hours per Use, and AHI control that is much higher than published averages.

At 12 mos, compliant subjects (82% of pop. using PAP 89% of days, for an avg. just under 6 hrs/use) showed reduced sleepiness (avg ESS 6.3 to 3.5); enhanced vigilance, vitality, productivity and social functioning (FOSQ & SF-36 data above).

Significant data loss due to the use of data cards was noted and may be addressed by the continnual use of wireless monitoring. Objective data escalation management is essential to this effective alternative to the traditional treatment pathway for OSA in professional drivers and other remote workers.